FLOOD HISTORY
AND
FLOOD PLAIN CHARACTERISTICS IN
PALO ALTO, CALIFORNIA.

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Location and Topography

The City of Palo Alto is located in what is generally described as the San Francisco Bay Area near the southerly limits of San Francisco Bay within Santa Clara County. The City is bordered on the northeast by the Bay waters and the developed portion of the City extends southwesterly to the base of foothills to an average elevation of 300 feet above sea level. The City is also bounded by San Francisquito Creek to the northwest and Adobe Creek and San Antonio Road to the southeast. Beyond the developed area, the City has incorporated a large area for future park development which extends south and easterly into the foothills and on to the crest of the Santa Cruz Mountains (which also forms the Santa Cruz County line). Except for the Palo Alto Yacht Harbor, no developed areas of Palo Alto front on open bay water, but instead are separated by a series of dikes erected in the early part of the century to form salt evaporation ponds. The area lying immediately southwesterly of the interior dike system to Bayshore Freeway (Route 101) is generally referred to as the "Baylands".

Flood Control Measures

Four streams, which have their headwaters in the Santa Cruz Mountains, course through Palo Alto on their way to an outfall in San Francisco Bay. Three of these streams, Matadero Creek, Adobe Creek, and Barron Creek, discharge into the Palo Alto Flood Basin. This flood basin contains over 600 acres and was a salt evaporation pond abandoned by the salt company and later purchased by the City of Palo Alto. The former pond has been used for many years as a storage of runoff waters during high tide with release through tide gates during ebb tide. The fourth and largest stream, San Francisquito Creek, originates in the coastal mountains of San Mateo County, flows northeasterly to the San Mateo-Santa Clara County line, and then becomes the geographical common county boundary for the greater part of its continuing course to open water in San Francisco Bay. The area northeasterly of Bayshore Freeway (Baylands area), the area immediately southwest of the Bayshore Freeway, extensive areas along San Francisquito Creek and limited areas along Barron, Matadero and Adobe Creeks have a history of flooding within the City. This flood plain comprises about 6.6 square miles.

In 1956 the Santa Clara County Flood Control and Water District proposed a bond issue for improvement of streams in their Northwest Zone which includes the Palo Alto area, and it was approved by the electorate. The four streams which flow through Palo Alto were contained in this improvement program and since 1957, utilizing bonds and pay-as-you-go tax funds, the Flood Control District has pursued a continuing program of channel improvement which has afforded a measure of flood protection to the City of Palo Alto. Included in this improvement was the enlargement and levee work on the three streams which discharge into the Palo Alto Flood Basin; riprap and other bank stabilization work on San Francisquito Creek; installation of a large battery of tide gates in the Flood Basin, dredging of the stream channels and raising of the levees in the Palo Alto Flood Basin; and the maintenance of levees on San Francisquito Creek and along the Bay front which protect Palo Alto from inundation by saltwater.

In addition to flood protection works installed by the Flood Control District, the City has constructed several miles of storm drains, some of them with a diameter as large as 72 inches. Because of the low elevation at outfalls of some of the storm drains, two pumping stations have been installed, one at the outfall into Matadero Creek and a second at the outfall into Adobe Creek, immediately south of Bayshore Freeway (Bayshore closely parallels the interior dike system mentioned above). A combined operation of storage and low-tide-release from the Palo Alto Flood Basin together with both gravity and pump flow from the City storm drain system has functioned quite well and provides drainage and some measure of flood protection for the northeasterly (Baylands) portions of the City that are near or below high tide level. However, none of the streams outfalling into the Flood Basin can provide protection against the one percent flood (100-year event) until the Flood Basin is enlarged to provide the needed volume of flood water storage.

On San Francisquito Creek, the U.S. Army Corps of Engineers has studied the possibility of a Federal project for several years, but no construction has resulted and as a matter of self preservation, San Mateo and Santa Clara Counties combined to install emergency interim improvements. These facilities will not provide protection against the one percent (100-year) flood but will protect against flooding such as occurred in 1955.

The Flood Control District also improved a major storm drain outfall in the area of Stanford University, called Stanford Channel, which outfalls into Matadero Creek at El Camino Real, and the City has connected several collector storm drains to this facility.

A condition which seriously compounds the flooding problem in the Palo Alto Baylands area is land surface subsidence. Levees must be designed and maintained to compensate for this general lowering of the land surface. As a result of improved water management, including the importation of supplemental water, the underground water table has risen resulting in an apparent slowing down of subsidence. Prior to subsidence (which has totaled from three to five feet in the Palo Alto area) most of the then-existing Palo Alto storm drains discharged into adjacent creeks and the Palo Alto Flood Basin by gravity, except during periods of excessively high flow in the outfall stream channels. However, subsidence has brought a large area below the average elevation of tidal waters in San Francisco Bay and has necessitated the installation of the pumps mentioned above.

Historical Flooding

Early records of flooding in the Palo Alto area are sketchy and descriptive only in nature and do not list any estimate or measure of actual volume of water flowing from streams into San Francisco Bay. The earliest recorded flood in the Palo Alto area was in the rainfall year of 1861-62 and may have been the greatest flood in the recent history of California. However, it was probably closely rivaled by the severe flood of 1892-93. Other major floods occurred in 1910-11, 1918-19, 1940-41, 1951-52, 1955-56 and 1957-58. The December 1955 flood was the last high flow prior to construction of the flood control measures by the Flood Control District. At that time, Palo Alto was subjected to flooding from overbanking of the streams that run through the City, the most serious being from San Francisquito Creek.

During the 1955 flood, between four and six hundred homes within the Palo Alto City limits were inundated above floor level, causing evacuation from most of them for a few hours up to several days. Most of this flooding was from San Francisquito Creek and covered the area bounded on the west by the creek channel, on the east by Channing Avenue, on the south by Louis Road and on the north by Bayshore Freeway. At that time this area contained approximately 15 percent to 20 percent of the inhabited area of Palo Alto. In addition, high tides and winds in San Francisco Bay also combined to breach some of the outer levees, which in turn caused overflow of adjacent salt ponds and some saltwater flooding occurred in the easterly Baylands area of Palo Alto.

In early years when the Bay front levees were nonexistent and channels received no maintenance care, the entire Bay front area was inundated to a depth of several feet during major floods. In addition, more limited areas adjacent to each stream were inundated by flows of lesser depth. This area of shallow flooding occurred in the area roughly bounded on the north by Louis Road and on the south by Foothills Expressway in narrow strips along each of the three creeks which outfall into Palo Alto Flood Basin (Matadero, Barron and Adobe). The flooded areas are delineated on the attached map prepared by the Santa Clara County Flood Control and Water District in September 1970 entitled "Generalized Map of Historic Flooding in Santa Clara County".

Areas Subject to Flooding Under 1970 Conditions

The combined facilities installed by Palo Alto and the Santa Clara County Flood Control and Water District described under "Flood Control Measures" have reduced the area subject to flooding within the City limits to those shown on the attached "Generalized Map of Areas Subject to Flooding in Santa Clara County Based on 1970 Conditions". This map shows that the Baylands, areas southwesterly of Bayshore Freeway, areas along San Francisquito Creek and localized areas along Barron, Matadero and Adobe Creeks are still subject to flooding. The Bayland area below elevation five is subject to extensive frequent flooding, but the balance of the Baylands area and the areas along San Francisquito Creek are subject to flooding to a less frequent degree. Considerable additional work needs to be done in raising and strengthening the Bay front levees to prevent potential saltwater flooding; this project is being studied by the Flood Control District at the present time.